

Appendix C

Hazardous Materials Management Plan

APPENDIX C

HAZARDOUS MATERIALS MANAGEMENT PLAN

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APPENDIX C. HAZARDOUS MATERIALS MANAGEMENT PLAN

1 Introduction

This Hazardous Materials Management Plan is provided pursuant to Bureau of Land Management (BLM) Instruction Memoranda Numbers WO-93-344 and WY-94-059, which require that all National Environmental Policy Act (NEPA) documents list and describe any hazardous and extremely hazardous materials that would be produced, used, stored, transported, or disposed of as a result of a proposed project. Hazardous materials, as defined herein, are those substances listed in the United States Environmental Protection Agency's (USEPA's) List of Hazardous Substances (40 Code of Federal Regulations [CFR] Part 302) and extremely hazardous materials are those identified in the USEPA's List of Extremely Hazardous Substances (40 CFR Part 355). For purposes of this discussion, compounds included in the Clean Air Act Section 112(r) as the List of Substances for Accidental Release Prevention (40 CFR Part 68) are also considered hazardous materials. Materials identified on any of these lists that are expected to be used or produced by the proposed project are discussed herein.

A list of hazardous and extremely hazardous materials that are expected to be produced, used, stored, transported, or disposed of as a result of exploration and production operations was assembled into table C-1 and this management plan. Where possible, the quantities of these products or materials have been estimated on a per-well basis.

Some potentially hazardous materials that may be used in small, unquantifiable amounts have been excluded from this management plan. These materials might include:

- Wastes, as defined by the Solid Waste Disposal Act;
- Wood products, manufactured items, and articles that do not release or otherwise result in exposure to a hazardous material under normal conditions of use (e.g., steel structures, automobiles, and tires); and
- Food, drugs, tobacco products, and other miscellaneous substances (e.g., WD-40, gasket sealants, and glues).

Project personnel will be directed to properly manage and dispose of hazardous materials. Solid wastes generated at well locations will be collected in approved waste facilities (e.g., dumpsters). Each well location will be provided with one or more such facilities during drilling and completion operations. Solid wastes will be regularly removed from well locations and transported to an approved disposal facility.

Materials produced, used, stored, transported, or disposed of during the exploration and production phases of the project may be hazardous or may contain hazardous constituents. The following discussion will address the hazardous substances generally associated with the lifecycle of a coal bed methane well.

2 Production Streams

The purpose of the proposed project is to extract natural gas primarily from coal seams within the Mesaverde Group as well as from other targeted deep formations. Water and possibly liquid hydrocarbons will be produced as a result of the extraction operations. Table C-1 lists and quantifies, where possible, the hazardous and extremely hazardous substances that may be found in the production streams.

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2.1 Natural Gas

Natural gas will be produced from up to approximately 1,800 coal bed methane wells, some of which will include conventional wells, within the boundaries of the project at an average rate of 0.2 million cubic feet per day per well. The natural gas produced from the wells will primarily contain methane, ethane, nitrogen, and carbon dioxide. Hexane, polynuclear aromatic hydrocarbons (PAHs), and polycyclic organic matter (POM) are hazardous substances that might be present in the gas stream. No other hazardous substances are known to occur within the natural gas stream.

The natural gas produced from the project area wells will be transported from each location through newly constructed pipelines linking well locations to existing or newly constructed centralized production facilities. Natural gas storage facilities are not expected to be used.

2.2 Produced Water

Produced water from wells within the project boundaries is expected to average 200 barrels per day per well. The water quality of the produced water will vary and will be monitored periodically. Water from the coal seams within the Mesaverde Group and other targeted formations is known to contain the following hazardous substances:

Antimony	Copper	Selenium
Arsenic	Cyanide	Silver
Barium	Lead	Sodium
Beryllium	Mercury	Thallium
Cadmium	Nickel	Zinc
Chromium	Radium 226	

Phenol, an extremely hazardous substance, is also found in the produced water stream. No other hazardous or extremely hazardous materials are known to be present.

Produced water will be re-injected into underground aquifers as permitted by the Wyoming Department of Environmental Quality (WDEQ). The water quality of the produced water will be monitored periodically. Produced water that meets applicable standards may be discharged to the surface at appropriate locations into closed systems for watering livestock or wildlife. Agency authorizations that must be obtained before disposing of produced water include:

- BLM approval of disposal methodologies,
- WDEQ Water Quality Division approval of wastewater disposal (e.g., National Pollutant Discharge Elimination System permits and Underground Injection Control permits),
- Wyoming Oil and Gas Conservation Commission (WOGCC) evaporation pond permits, and
- Wyoming State Engineer's Office dewatering permits.

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2.3 Liquid Hydrocarbons

Condensate or other liquid hydrocarbon production associated with the natural gas stream is not expected from productive coal bed methane wells in the project area. Liquid hydrocarbons are likely to be produced from any successful conventional wells that might occur. Should any liquid hydrocarbons be produced, the stream would typically contain the following hazardous substances:

Benzene	POM
Ethylbenzene	Toluene
n-Hexane	Xylenes
PAHs	

No extremely hazardous materials are expected to be present in any potential liquid hydrocarbon stream.

Liquid hydrocarbons, if produced, will be stored in tanks at centralized production facilities. The tanks will be fenced and bermed to contain the entire storage capacity of the largest tank plus 1 foot of freeboard, as mandated by the BLM. Liquid hydrocarbons, if produced, will be periodically removed from the storage tanks and transported via truck outside the project area, in adherence to Department of Transportation (DOT) rules and regulations. Necessary regulatory approvals for the production, storage, and transport of liquid hydrocarbons, including the Oil Pollution Act of 1990 (storage of >1,000,000 gallons), will be addressed before the initiation of liquid hydrocarbon production activities.

3 Exploration and Production Activities

Exploration and production activities associated with the project area will include geophysical, construction, drilling, testing, completion, production, maintenance, transportation, abandonment, and reclamation components.

Known hazardous and extremely hazardous materials typically used during exploration and production operations in the project area are listed in table C-1 and generally fall into the following categories:

- Fuels,
- Lubricants,
- Coolant/antifreeze and heat transfer agents,
- Drilling fluids,
- Fracturing fluids,
- Cement and additives, and
- Miscellaneous materials.

3.1 Fuels

Gasoline, diesel, Jet A fuel, natural gas, and propane are the fuels that may be employed within the boundaries of the project area. Each of the fuels contains materials classified as hazardous. Gasoline and diesel will be used by vehicles providing transport to and from the project area. Diesel, gasoline, and Jet A fuel will be used for geophysical survey operations. Diesel fuel will also be used in drilling operations and construction equipment, and as a minor component of

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fracturing fluids. Natural gas produced by the proposed project will be used to power compressor engines and other ancillary facilities. Propane will be used for miscellaneous heating purposes.

3.1.1 Gasoline

Gasoline will be used to power vehicles traveling to and from the project area. Gasoline will be purchased from regional vendors and primarily stored and transported in vehicle gas tanks. Some additional gasoline may be stored in appropriately designed and labeled 1- to 5-gallon containers for supplemental use as vehicle fuel. No large-scale storage of gasoline is anticipated. The hazardous substances expected to be present in gasoline include:

Benzene	Methyl tert-butyl ether	Toluene
Cyclohexane	Naphthalene	Xylenes
Ethylbenzene	PAHs	
n-Hexane	POM	

No extremely hazardous materials are expected to be present in the gasoline.

3.1.2 Diesel

Diesel fuel will be used to power transport vehicles, geophysical vehicles, drilling rigs, and construction equipment. Each well location will have aboveground storage tanks containing diesel fuel during drilling operations. Tanks will be filled by a local fuel supplier. Diesel fuel will be used, transported, and stored in accordance with all relevant local, state, and federal rules, regulations, and guidelines. The hazardous substances expected to be present in diesel fuel include:

Benzene	POM
Ethylbenzene	Toluene
Naphthalene	Xylenes
PAHs	

No extremely hazardous materials are expected to be present in the diesel fuel.

3.1.3 Jet A Fuel

Jet A fuel will be used to power geophysical vehicles. Jet A fuel will be purchased from regional vendors and primarily stored and transported in vehicle tanks. Some additional Jet A fuel may be stored in appropriately designed and labeled containers for supplemental use. No large-scale storage of Jet A fuel is anticipated. The hazardous substances expected to be present in Jet A fuel include:

Benzene	Methyl tert-butyl ether	Toluene
Cyclohexane	Naphthalene	Xylenes
Ethylbenzene	PAHs	
n-Hexane	POM	

No extremely hazardous materials are expected to be present in the Jet A fuel.

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3.1.4 Natural Gas

Natural gas produced on site will be burned to power compressor engines and other ancillary facilities. Hazardous materials expected to be present in natural gas include n-hexane, PAHs, and POM. No extremely hazardous materials are known to exist in the natural gas from the project area.

3.1.5 Propane

Propane will be used for miscellaneous heating purposes throughout the project area. The propane will be purchased from regional vendors and transported and stored in appropriate tanks. No large-scale storage of propane is anticipated. The only hazardous material expected to be present in propane is propylene. No extremely hazardous materials are known to be present in propane.

3.2 Lubricants

Various lubricants, including motor oils, hydraulic oils, transmission oils, compressor lube oils, and greases, will be used in project equipment and machinery. Lubricants may contain hazardous substances, particularly:

Barium	Lead	PAHs
Cadmium	Manganese	POM
Copper	Nickel	Zinc

No extremely hazardous materials are known to be present in the lubricants required for the proposed project.

The lubricants will be used, stored, transported, and disposed of following manufacturers' guidelines and local, state, and federal requirements.

3.3 Coolant/Antifreeze and Heat Transfer Agents

Various materials will be used as coolant/antifreeze and heat transfer agents in association with the project. Ethylene glycol, a hazardous substance, will be used as an engine coolant/antifreeze in vehicles, construction equipment, gas dehydrators, and drilling and workover rigs. In addition, ethylene glycol will be used as a heat transfer fluid during well completion and maintenance operations. No extremely hazardous materials are known to be present in the coolant/antifreeze and heat transfer agents required for the proposed project.

Ethylene glycol will be disposed of in accordance with applicable local, state, and federal rules and regulations.

3.4 Drilling Fluids and Reserve Pit Maintenance

Water-based muds (drilling fluids) will be used for drilling each well. Drilling fluid additives consist of clays and other materials that are used in accordance with standard industry practices. Drilling fluid additives that are expected to be used during the drilling phase of coal bed methane well installation and their hazardous and extremely hazardous components are listed in table C-1. Drilling operations will be conducted in compliance with applicable BLM, WOGCC, and WDEQ rules and regulations.

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Drilling fluid additives will be transported to well locations during drilling operations in appropriate sacks and other containers, in compliance with DOT regulations.

Drilling fluids, cuttings, and water will be stored in reserve pits. The following protection actions will be employed at the reserve pits, as deemed appropriate by the BLM and WOGCC: netting (1-inch mesh) to protect waterfowl, other birds, and bats; pit liners to protect shallow groundwater aquifers and to conserve water; and perimeter fencing to protect wildlife. Following drilling and completion operations, the reserve pit contents will be evaporated or solidified in place, the pit backfilled, and the surface reclaimed. Reserve pit solidification and closure procedures will be approved by the BLM, WOGCC, or WDEQ before implementation. Alternatively, reserve pit contents may be removed and disposed of at an appropriate off-site facility in a manner commensurate with applicable local, state, and federal regulations.

3.5 Fracturing Fluids

Hydraulic fracturing is not expected to be performed on the coal bed methane wells within the project area. However, it is possible that a well will be hydraulically fractured periodically to augment gas flow rates. Fracturing fluids potentially containing hazardous substances that may be used within the project area are listed in table C-1. No extremely hazardous materials are known to be present in the fracturing fluids required for the proposed project.

Fracturing fluids and additives will be transported to well locations in bulk or in appropriately designed and labeled containers. Transportation of fracturing fluids and additives will be in adherence with DOT rules and regulations.

During fracturing, fluids are pumped under pressure down the wellbore and out through perforations in the casing into the formation. The pressurized fluid enters the formation and induces hydraulic fractures. When the pressure is released at the surface, a portion of the fracturing fluids will be forced back into the wellbore, up to the surface, and into a tank. The fracturing fluids will then be transferred to lined reserve pits and evaporated or transported off site for reuse or disposal at an authorized facility. BLM, WOGCC, and WDEQ will determine the appropriate disposal of fracturing fluids on a case-by-case basis.

3.6 Cement and Additives

Well completion and abandonment operations include cementing and plugging various segments of the wellbore to protect freshwater aquifers and other downhole resources. Materials potentially used for cementing operations include cement, calcium hydroxide, calcium chloride, pozzolans, sodium bicarbonate, potassium chloride, and insulating oil. An unknown quantity of cement and additives will be transported in bulk to each well location. These additives might contain the hazardous material classes of fine mineral fibers, PAHs, and POM. Small quantities might also be transported and stored on site in 50-pound sacks. Wells will be cased and cemented, as directed and approved by the BLM or WOGCC.

3.7 Miscellaneous Materials

Miscellaneous materials will be used during geophysical, construction, drilling, testing, completion, production, maintenance, transportation, abandonment, and reclamation activities. Miscellaneous materials potentially containing hazardous substances that might be used within the project area are listed in table C-1. Quantities of these miscellaneous materials are unknown. Materials will be transported to the site by service and supply companies and will be

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used, stored, transported, and disposed of following manufacturers' guidelines and local, state, and federal requirements.

In conformance with all applicable regulatory requirements, industry-standard pipeline materials, equipment, techniques, and procedures will be employed during construction, testing, operation, and maintenance activities to ensure pipeline safety and efficiency.

Small quantities of natural gas may be vented at certain well locations during testing operations. During testing, produced gas will be vented into a flare pit pursuant to the applicable BLM, WOGCC, and WDEQ rules and regulations. BLM, WOGCC, and WDEQ approval, as appropriate, will be obtained before beginning venting operations.

4 Combustion Emissions

Gasoline and diesel engines, flaring of natural gas, and fired production equipment will produce combustion emissions within the project area. The complete oxidation of hydrocarbon fuel yields only carbon dioxide and water as combustion products. However, complete combustion is seldom achieved. Unburned hydrocarbons, particulate matter, carbon monoxide, nitrogen oxides, and possibly sulfur oxides will be components of the exhaust streams. The formation of ozone from the photolysis of nitrogen oxides will also be expected. A listing of the hazardous and extremely hazardous materials potentially present in combustion emissions is provided in table C-1.

Unburned hydrocarbons might contain potentially hazardous PAHs; while, particulate matter may contain metal-based particles from metallic lubricating oil additives and engine wear. Hazardous materials in the particulate matter might therefore include compounds of lead, cadmium, nickel, copper, manganese, barium, and zinc. Particulate matter emissions and larger unburned hydrocarbons will eventually settle out onto the ground surface; whereas, gaseous emissions will react with other air constituents as components of the nitrogen, sulfur, and carbon cycles.

Nitrogen dioxide, sulfur dioxide, sulfur trioxide, and ozone are potential combustion emissions classified as extremely hazardous materials. Releases of these or other materials will not exceed allowable thresholds established by the Prevention of Significant Deterioration and WDEQ air quality regulations or the National Ambient Air Quality Standards.

5 Management Policy and Procedure

Project operators and their contractors will ensure production, use, storage, transport, and disposal of hazardous and extremely hazardous materials associated with the proposed project in strict accordance with applicable existing or hereafter promulgated federal, state, and local government rules, regulations, and guidelines. Project-related activities involving the production, use, or disposal of hazardous or extremely hazardous materials will be conducted in such a manner so as to minimize potential environmental impacts.

Project operators will comply with emergency reporting requirements for releases of hazardous materials. Releases of hazardous or extremely hazardous substances in excess of the reportable quantity, as established in 40 CFR Part 117, will be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended. The materials for which such notification must be given are the extremely hazardous substances listed under the Emergency Planning and Community Right to Know Act,

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Section 302, and the hazardous substances designated under Section 102 of CERCLA, as amended. If a reportable quantity of a hazardous or extremely hazardous substance is released, prompt notice of the release will be given to the BLM's Authorized Officer and other appropriate local, state, and federal agencies.

In addition, notice of any spill or leakage (i.e., any undesirable event), as defined in BLM NTL-3A, shall be given to the Authorized Officer and other such local, state, and federal officials, as required by law.

Project operators will prepare and implement, as necessary, the following plans and policies:

- Spill prevention and control countermeasure plans;
- Storm water pollution prevention plans;
- Liquid hydrocarbon spill response plans;
- Inventories of hazardous chemical categories pursuant to Section 312 of the Superfund Amendments and Reauthorization Act, as amended; and
- Emergency response plans.

Copies of the above will be maintained by the operators, as required by regulation, and will be made available upon request.

Exploration and production activities in the project area will comply with regulations promulgated under the Resource Conservation and Recovery Act, CERCLA, the Clean Water Act, the Safe Drinking Water Act, the Toxic Substances Control Act, the Occupational Safety and Health Act, the Clean Air Act, and NEPA as appropriate. In addition, project activities will also comply with applicable state rules and regulations relating to hazardous material handling, storage, transportation, management, disposal, and reporting.

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Table C-1. Hazardous and Extremely Hazardous Materials Potentially Used or Produced during Construction, Drilling, Production, and Reclamation Operations

Source	Hazardous Substances ¹	Extremely Hazardous Substances ²	Cas No.	Approximate Quantities Used or Produced Per Well
Production Streams				
Natural Gas				0.2 mmcf/d
	n-Hexane		110-54-3	
	PAHs		-	
	POM		-	
Produced Water				200 bpd
	Antimony		7440-36-0	
	Arsenic		7440-38-2	
	Barium		7440-39-3	
	Beryllium		7440-41-7	
	Cadmium		7440-43-9	
	Chromium		7440-47-3	
	Copper		7440-50-8	
	Cyanide		-	
	Lead		7439-92-1	
	Mercury		7439-97-6	
	Nickel		7440-02-0	
		Phenols	108-95-2	
	Radium 226		-	
	Selenium		7782-49-2	
	Silver		7440-22-4	
	Sodium		7440-23-5	
	Thallium		7440-28-0	
	Zinc		7440-66-6	
Liquid Hydrocarbons				UNK
	Benzene		71-43-2	
	Ethylbenzene		100-41-4	
	n-Hexane		110-54-3	
	PAHs		-	
	POM		-	
	Toluene		108-88-3	
	Xylenes		1330-20-7	
Fuels				
Gasoline				UNK
	Benzene		71-43-2	
	Cyclohexane		110-82-7	
	Ethylbenzene		100-41-4	
	n-Hexane		110-54-3	
	Methyl tert-butyl ether		1634-04-4	
	Naphthalene		91-20-3	
	PAHs		-	
	POM		-	
	Toluene		108-88-3	
	Xylenes		1330-20-7	

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Source	Hazardous Substances ¹	Extremely Hazardous Substances ²	Cas No.	Approximate Quantities Used or Produced Per Well
Diesel	Benzene Ethylbenzene Naphthalene PAHs POM Toluene Xylenes		71-43-2 10041-4 91-20-3 - - 108-88-3 108-38-3	UNK
Jet A Fuel	Benzene Cyclohexane Ethylbenzene n-Hexane Methyl tert-butyl ether Naphthalene PAHs POM Toluene Xylenes		71-43-2 110-82-7 100-41-4 110-54-3 1634-04-4 91-20-3 - - 108-88-3 108-38-3	UNK
Natural Gas	n-Hexane PAHs POM		110-54-3 - -	UNK
Propane	Propylene		115-07-1	UNK
Lubricants	Barium Cadmium Copper Lead Manganese Nickel PAHs POM Zinc		7440-39-3 7440133-9 7440-50-8 7439-92-1 7439-96-5 7440-02-0 - - 7440-66-6	UNK
Coolant/Antifreeze And Heat Transfer Agents	Ethylene glycol		107-21-1	UNK
Drilling Fluids	Barite	Barium compounds	-	16,000 lb
		Fine mineral fibers	-	
Bentonite		Fine mineral fibers	-	45,000 lb
Caustic Soda		Sodium hydroxide	1310-73-2	750 lb
Glutaraldehyde		Isopropyl alcohol	67-63-0	20 gal
Lime		Fine mineral fibers	-	3,500 lb

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Source	Hazardous Substances ¹	Extremely Hazardous Substances ²	Cas No.	Approximate Quantities Used or Produced Per Well
Mica	Fine mineral fibers		-	600 lb
Modified Tannin	Ferrous sulfate		7720-78-7	250 lb
	Fine mineral fibers		-	
Phosphate Esters	Methanol		67-56-1	100 gal
Polyacrylamides		Acrylamide	79-06-1	100 gal
	PAHs		-	
	POM		-	
Retarder	Fine mineral fibers		-	400 lb
Fracturing Fluids				
Biocides	Fine mineral fibers		-	UNK
	PAHs		-	
	POM		-	
Breakers	Copper compounds		-	UNK
	Ethylene glycol		107-21-1	
	Fine mineral fibers		-	
	Glycol ethers		-	
Clay Stabilizer	Fine mineral fibers		-	UNK
	Glycol ethers		-	
	Isopropyl alcohol		67-63-0	
	Methanol		67-56-1	
	PAHs		-	
	POM		-	
Crosslinkers	Ammonium chloride		12125-02-9	UNK
	Methanol		67-56-1	
	Potassium hydroxide		1310-58-3	
	Zirconium nitrate		13746-89-9	
	Zirconium sulfate		14644-61-2	
Foaming Agent	Glycol ethers		-	UNK
Gelling Agent	Benzene		71-43-2	UNK
	Ethylbenzene		100-41-4	
	Methyl tert-butyl ether		1634-04-4	
	Napthalene		91-20-3	
	PAHs		-	
	POM		-	
	Sodium hydroxide		1310-73-2	
	Toluene		108-88-3	
	Xylenes		1330-20-7	
Ph Buffers	Acetic acid		64-19-7	UNK
	Benzoic acid		65-85-0	

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Source	Hazardous Substances ¹	Extremely Hazardous Substances ²	Cas No.	Approximate Quantities Used or Produced Per Well
Ph Buffers	Fumaric acid Hydrochloric acid Sodium hydroxide		110-17-8 7647-01-0 1310-73-2	
Sands	Fine mineral fibers		-	UNK
Solvents	Glycol ethers		-	UNK
Surfactants	Glycol ethers Isopropyl alcohol Methanol PAHs POM		- 67-63-0 67-56-1 - -	UNK
Cement And Additives				
Anti-Foamer	Glycol ethers		-	100 lb
Calcium Chloride Flake	Fine mineral fibers		-	2,500 lb
Cellophane Flake	Fine mineral fibers		-	300 lb
Cement	Aluminum oxide Fine mineral fibers		1344-28-1 -	77,000 lb
Chemical Wash	Ammonium hydroxide Glycol ethers		1336-21-6 -	850 gal
Diatomaceous Earth	Fine mineral fibers		-	1,000 lb
Extenders	Aluminum oxide Fine mineral fibers		1344-28-1 -	17,500 lb
Fluid Loss Additive	Fine mineral fibers Naphthalene	Acrylamide	79-06-1 - 91-20-3	900 lb
Friction Reducer	Fine mineral fibers Naphthalene PAHs POM		- 91-20-3 - -	160 lb
Mud Flash	Fine mineral fibers		-	250 lb
Retarder	Fine mineral fibers		-	100 lb

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Salt	Fine mineral fibers		-	2,570 lb
Silica Flour	Fine mineral fibers		-	4,800 lb
Miscellaneous Materials				
Acids	Acetic anhydride		108-24-7	UNK
	Formic acid		64-18-6	
	Sodium chromate		777-11-3	
		Sulfuric acid	7664-93-9	
Batteries	Cadmium		744043-9	UNK
		Cadmium oxide	1306-19-0	
	Lead		7439-92-1	
	Nickel hydroxide		7440-02-0	
	Potassium hydroxide		1310-58-3	
		Sulfuric acid	7664-93-9	
Biocides		Formaldehyde	50-00-0	UNK
	Isopropyl alcohol		67-63-0	
	Methanol		67-56-1	
Cleaners	Hydrochloric acid		7647-01-0	UNK
Corrosion Inhibitors	4,4' Methylene dianiline		101-77-9	UNK
	Acetic acid		64-19-7	
	Ammonium bisulfite		10192-30-0	
	Diethylamine		109-89-7	
	Dodecylbenzenesulfonic acid		27176-87-0	
	Ethylene glycol		107-21-1	
	Isobutyl alcohol		78-83-1	
	Isopropyl alcohol		67-63-0	
	Methanol		67-56-1	
	Naphthalene		91-20-3	
	Sodium nitrite		7632-00-0	
	Toluene		108-88-3	
	Xylenes		1330-20-7	
Corrosion Inhibitors	Zinc carbonate		3486-35-9	
Emulsion Breakers	Acetic acid		64-19-7	UNK
	Acetone		67-64-1	
	Ammonium chloride		12125-02-9	
	Benzoic acid		65-85-0	
	Isopropyl alcohol		67-63-0	
	Methanol		67-56-1	
	Naphthalene		91-20-3	

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Emulsion Breakers	Toluene Xylenes Zinc chloride		108-88-3 1330-20-7 7646-85-7	
Explosives, Fuses, Detonators, and Boosters	Benzene Ethylbenzene Ethylene glycol Lead compounds Methyl tert-butyl ether Naphthalene Nitroglycerine PAHs POM Toluene Xylenes	Nitric acid	71-43-2 100-41-4 107-21-1 7439-92-1 1634-04-0 91-20-3 7697-37-2 55-63-0 - - 108-88-3 1330-20-7	UNK
Fertilizers	UNK		-	UNK
Herbicides	UNK		-	UNK
Lead-Free Thread Compound	Copper Zinc		7440-50-8 7440-66-6	25 gal
Methanol	Methanol		67-56-1	200 gal
Motor Oil	Zinc compounds		-	220 gal
Paints	Barium n-Butyl alcohol Cobalt Lead Manganese PAHs POM Toluene Triethylamine Xylenes	Sulfuric acid	7440-39-3 71-36-3 7440-48-4 7439-92-1 7439-96-5 - - 7664-93-9 108-88-3 121-44-8 1330-20-7	UNK
Paraffin Control		Carbon disulfide	75-15-0	UNK
Paraffin Control	Ethylbenzene Methanol Toluene Xylenes		100-41-4 67-56-1 108-88-3 1330-20-7	
Photoreceptors	Selenium		7782-49-2	UNK

APPENDIX C. HAZARDOUS MATERIALS MANAGEMENT PLAN

Table C-1. Hazardous and Extremely Hazardous Materials Potentially Used or Produced during Construction, Drilling, Production, and Reclamation Operations

Source	Hazardous Substances ¹	Extremely Hazardous Substances ²	Cas No.	Approximate Quantities Used or Produced Per Well
Pipeline				
Coating	Aluminum oxide		1334-28-1	UNK
Cupric Sulfate Solution	Cupric sulfate	Sulfuric acid	7758-98-7 7664-93-9	UNK
Diethanolamine	Diethanolamine		111-42-2	UNK
LP Gas	Benzene n-Hexane Propylene		71-43-2 110-54-3 115-07-1	UNK
Molecular Sieves	Aluminum oxide		1344-28-1	UNK
Pipeline Primer	Naphthalene Toluene		91-20-3 108-88-3	UNK
Potassium Hydroxide Solution	Potassium hydroxide		1310-58-3	UNK
Rubber Resin Coatings	Acetone Ethyl acetate Methyl ethyl ketone Toluene Xylene		67-64-1 141-78-6 78-93-3 108-88-3 1330-20-7	UNK
Scale Inhibitors	Acetic acid Ethylene diamine tetraacetic acid Ethylene glycol Formaldehyde Hydrochloric acid Isopropyl alcohol Methanol Nitrilotriacetic acid		64-19-7 60-00-4 107-21-1 50-00-0 7647-01-0 67-63-1 67-56-1 139-13-9	UNK
Sealants	1,1,1-trichloroethane n-Hexane PAHs POM		71-55-6 110-54-3 - -	UNK
Solvents	1,1,1-trichloroethane Acetone t-Butyl alcohol Carbon tetrachloride Isopropyl alcohol Methyl ethyl ketone		71-55-6 67-64-1 75-65-0 56-23-5 67-63-0 108-10-1	UNK

APPENDIX C. HAZARDOUS MATERIALS MANAGEMENT PLAN

Table C-1. Hazardous and Extremely Hazardous Materials Potentially Used or Produced during Construction, Drilling, Production, and Reclamation Operations

Source	Hazardous Substances ¹	Extremely Hazardous Substances ²	Cas No.	Approximate Quantities Used or Produced Per Well
Solvents	Methanol PAHs POM Toluene Xylenes		67-56-1 - - 108-88-3 1330-20-7	
Starting Fluid	Ethyl ether		60-29-7	UNK
Surfactants		Ethylene diamine	107-15-3	UNK
	Isopropyl alcohol		67-56-1	
Combustion Emissions				
Combustion Products		Formaldehyde	50-00-0	XXXX
		Nitrogen dioxide	10102-44-0	XXXX
		Ozone	10028-15-6	XXXX
		Sulfur dioxide	7446-09-5	XXXX
		Sulfur trioxide	7446-11-9	XXXX
Unburned Hydrocarbons	Benzene Ethylbenzene n-Hexane PAHs Toluene Xylenes		71-43-2 100-41-4 100-54-3 - 108-88-3 1330-20-7	XXXX
Particulate Matter	Barium Cadmium Copper Fine mineral fibers Lead Manganese Nickel POM Zinc		7440-39-3 7440-43-9 7440-50-8 - 7439-92-1 7439-96-5 7440-02-0 - 7440-66-6	XXXX

Notes:

¹ Hazardous Substances include those compounds identified in USEPA's List of Hazardous Substances (40 CFR Part 302) and List of Substances for Accidental Release Prevention (40 CFR Part 68).

² Extremely Hazardous Substances include those compounds identified in USEPA's List of Extremely Hazardous Substances (40 CFR Part 355).

bpd - barrels per day

lb - pounds

gal - gallons

mmcf/d - million cubic feet per day

PAHs - Polynuclear aromatic hydrocarbons

POM - Polycyclic organic matter

UNK - unknown